Space Weather Forecast

Issued on Friday, 07 October 2022 at 01:10 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: A chance of G1 Minor - G2 Moderate storms early day 1 (7th). Chance of isolated Moderate-flares with a very slight chance for Strong-flares.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low in the last 24 hours. A large sunspot in the northern centre disc has remained relatively stable, despite being a long and magnetically complex region. This still has the potential for notable flares. There are a number of other regions on the Earth-facing disc, however these are all smaller and simpler, with perhaps the exception being a region to the north of the large complex sunspot that has also been showing some intermittent signs of growth. No Earth-directed CMEs (coronal mass ejections) have been observed in the last 24 hours.

Solar Wind / Geomagnetic Activity: Solar wind speeds have been slightly elevated to elevated, between 450-540 km/s. Total magnetic field strength was weak throughout. The important north-south component was also weak, varying between the two directions, but was generally more southward directed. Geomagnetic activity was Quiet to Active (Kp 1-4).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) has been at background levels, with no solar proton storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to be mainly Low, with occasional Moderate activity and a slight chance of High activity.

Solar Wind / Geomagnetic Activity: A CME which left the Sun on the 4th has the potential to arrive at Earth early day 1 (7th), although confidence for this to occur is Low. This may lead to slightly elevated to elevated winds persisting through day 1. Otherwise current fast winds are expected to gradually fade, before the next fast wind enhancement either later day 2 (8th) or day 3 (9th) from a coronal hole, continuing into day 4 (10th). Geomagnetic activity is forecast to be Unsettled to Active at first, but with a chance of increasing to G1/Minor to G2/Moderate storm from any CME arrival on day 1. Activity should then ease to Quiet to Unsettled for a time by day 2, but with a chance of Active intervals and a slight chance of G1/Minor Storms again from any fast wind arrival later in the period, mainly on day 3.

Energetic Particles / Solar Radiation: The count rate of energetic particles is expected to be near or at background but with a chance of rising at times due to any further flaring from the notable sunspots. This giving a very slight chance of exceeding minor proton storm threshold.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	40	10	20	10
Strong	G3	No	2	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	50	40	40	40
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	10	10
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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